

# MATHEMATICS, BS

**Banner Code:** SC-BS-MATH

## Academic Advising

Website: [science.gmu.edu/academics/departments-units/mathematical-sciences/advising-and-student-support](http://science.gmu.edu/academics/departments-units/mathematical-sciences/advising-and-student-support)

Through an array of available concentrations ranging from pure mathematics to individualized studies to data science and beyond, the Mathematics, BS provides students with a thorough, customizable, and exciting education in mathematics.

## Teacher Licensure

Interested students should attend an information session early in their studies. For more information, visit the School of Education's website (<http://gse.gmu.edu/>).

Students majoring in biology who wish to pursue a career teaching secondary school may consider applying for the Secondary Education - Mathematics (6-12) Undergraduate Certificate (<http://catalog.gmu.edu/colleges-schools/education-human-development/school-education/secondary-education-mathematics-6-12-undergraduate-certificate/>) offered by the College of Education and Human Development (<http://catalog.gmu.edu/colleges-schools/education-human-development/>) as an option in seeking an initial Virginia teaching license.

Other routes to licensure include the Mathematics, BA or BS/Curriculum and Instruction, Accelerated MEd (Secondary Education Mathematics concentration) (<http://catalog.gmu.edu/colleges-schools/science/mathematical-sciences/mathematics-ba/#acceleratedmasterstext>) or select traditional Master's programs. Please contact the undergraduate advisor in the College of Education and Human Development (<http://catalog.gmu.edu/colleges-schools/education-human-development/>) for more information.

## Admissions & Policies

### Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies (<http://catalog.gmu.edu/admissions/undergraduate-policies/>) section of this catalog.

To apply for this program, please complete the George Mason University Admissions Application (<https://www2.gmu.edu/admissions-aid/apply-now/>).

### Policies

Students must fulfill all Requirements for Bachelor's Degrees (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2>), including the Mason Core (<http://catalog.gmu.edu/mason-core/>).

MATH 300 Introduction to Advanced Mathematics (Mason Core) (<http://catalog.gmu.edu/mason-core/>) meets the writing intensive requirement for this major.

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/>).

Graduating seniors are required to have an exit interview.

## Language Proficiency Recommendation

The department recommends proficiency in French, German, or Russian.

## Course Recommendations and Policies

A maximum of 6 credits of grades below 2.00 in coursework designated MATH or STAT may be applied toward the major.

Students intending to enter graduate school in mathematics are strongly advised to take MATH 315 Advanced Calculus I and MATH 321 Abstract Algebra.

Students may not receive credit for both MATH 214 Elementary Differential Equations and MATH 216 Theory of Differential Equations; both MATH 213 Analytic Geometry and Calculus III and MATH 215 Analytic Geometry and Calculus III (Honors); both MATH 351 Probability and STAT 344 Probability and Statistics for Engineers and Scientists I; and both MATH 352 Statistics and STAT 354 Probability and Statistics for Engineers and Scientists II.

After receiving a grade of 'C' or better in one of the courses listed below on the left, students may not receive credit for the corresponding course on the right:

Course	May Not Receive Credit for
MATH 113 or MATH 123	MATH 105 or MATH 108
MATH 351 or STAT 344	MATH 110
MATH 441	MATH 111
MATH 125	MATH 112

## Requirements

### Degree Requirements

Total credits: minimum 120

Students should refer to the Admissions & Policies tab for specific policies related to this program.

In addition to the Mathematics Core, Science, and Computational Skills requirements, students must select one concentration and complete the requirements therein.

### Mathematics Core

Code	Title	Credits
MATH 113	Analytic Geometry and Calculus I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 125	Discrete Mathematics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
MATH 203	Linear Algebra	3
MATH 213	Analytic Geometry and Calculus III	3

or MATH 215	Analytic Geometry and Calculus III (Honors)	
MATH 214	Elementary Differential Equations	3
or MATH 216	Theory of Differential Equations	
MATH 300	Introduction to Advanced Mathematics (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) <sup>1</sup>	3
MATH 322	Advanced Linear Algebra	3
Total Credits		26

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Fulfills the writing intensive requirement.

## Science

Code	Title	Credits
Select a one-year sequence of a laboratory science from the following courses:		8-9

### Biology Sequence:

BIOL 213	Cell Structure and Function (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )
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Choose one from the following:

BIOL 300	BioDiversity
BIOL 308	Foundations of Ecology and Evolution (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )
BIOL 311	General Genetics

### Chemistry Sequence:

CHEM 211 & CHEM 213	General Chemistry I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and General Chemistry Laboratory I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )
CHEM 212 & CHEM 214	General Chemistry II (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and General Chemistry Laboratory II (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )

### Geology Sequence:

GEOL 101 & GEOL 103	Physical Geology (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and Physical Geology Lab (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )
GEOL 102 & GEOL 104	Historical Geology (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and Historical Geology Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )

### Physics Sequence:

PHYS 160 & PHYS 161	University Physics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and University Physics I Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )
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PHYS 260 & PHYS 261	University Physics II (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and University Physics II Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
Total Credits		8-9

## Computational Skills

Code	Title	Credits
CS 112	Introduction to Computer Programming (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	4
Total Credits		4

## Individualized Concentration (IND)

Students who are looking for a flexible concentration option are able to customize their degree with the Individualized Concentration. The Individualized Concentration allows students to take coursework in a variety of fields. Students should work closely with a mathematics advisor and have their individual degree plan approved no later than their junior year.

Code	Title	Credits
<b>Required Courses</b>		
MATH 315	Advanced Calculus I	3
Select two from the following:		6
MATH 316	Advanced Calculus II	
MATH 321	Abstract Algebra	
MATH 421	Abstract Algebra II	
MATH 431	Topology	
MATH 432	Differential Geometry	
MATH 433	Algebraic Geometry	
MATH 464	Linear Algebra with Data Applications	
MATH 465	Mathematics of Data Science	

### Electives

Choose 12 additional upper-level MATH-prefixed credits, not taken above. (<http://catalog.gmu.edu/courses/math/>)<sup>1</sup>

### Additional Science

Select one option from the following: 4-9

1. A second sequence from the choices under "Science" above
2. 6 credits from more advanced courses in biology, chemistry, geology, or physics<sup>2</sup>
3. The 4-credit option of PHYS 262 and PHYS 263
4. Select two courses from the following:

CDS 230	Modeling and Simulation I
CDS 301	Scientific Information and Data Visualization
CS 211	Object-Oriented Programming
CS 310	Data Structures
CS 330	Formal Methods and Models
CS 483	Analysis of Algorithms

Total Credits 25-30

1

Excluding MATH 400 History of Math (Topic Varies) (Mason Core) (<http://catalog.gmu.edu/mason-core/>)

2

Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

### Concentration in Pure Mathematics (PURM)

Pure mathematics is the study of ideas and structures that underlie all of mathematics. This concentration provides exciting opportunities for students interested in advanced coursework in the fields traditionally referred to as "pure mathematics". The concentration prepares students for a wide variety of careers involving mathematical thinking or graduate studies in pure mathematics.

Code	Title	Credits
<b>Breadth Requirements</b>		
MATH 315	Advanced Calculus I	3
MATH 321	Abstract Algebra	3
MATH 411	Functions of a Complex Variable	3
Choose one from the following:		3
MATH 312	Geometry	
MATH 431	Topology	
<b>Depth Requirements</b>		
Select two from the following:		6
MATH 312	Geometry (if not chosen above)	
MATH 316	Advanced Calculus II	
MATH 325	Discrete Mathematics II	
MATH 421	Abstract Algebra II	
MATH 431	Topology (if not chosen above)	
MATH 432	Differential Geometry	
MATH 433	Algebraic Geometry	
<b>Additional Mathematics</b>		
Choose 3 credits of upper level MATH-prefixed credits ( <a href="http://catalog.gmu.edu/courses/math/">http://catalog.gmu.edu/courses/math/</a> ) <sup>1</sup>		3
<b>Additional Science</b>		
Select one option from the following:		4-9
1. A second sequence from the choices under "Science" above		
2. 6 credits from more advanced courses in biology, chemistry, geology, or physics <sup>2</sup>		
3. The 4-credit option of PHYS 262 and PHYS 263		
4. Select two courses from the following:		
CDS 230	Modeling and Simulation I	
CDS 301	Scientific Information and Data Visualization	
CS 211	Object-Oriented Programming	
CS 310	Data Structures	
CS 330	Formal Methods and Models	
CS 483	Analysis of Algorithms	
Total Credits		25-30

1

Excluding MATH 400 History of Math (Topic Varies) (Mason Core) (<http://catalog.gmu.edu/mason-core/>)

2

Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

### Concentration in Actuarial Mathematics (ACTM)

This concentration provides exciting opportunities for students interested in studying actuarial mathematics. Expertise in this field leads directly into a career as a practicing actuary with an insurance company, consulting firm, or in government employment.

Code	Title	Credits
<b>ACTM Courses</b>		
MATH 351	Probability	3
MATH 352	Statistics	3
MATH 551	Regression and Time Series	3
MATH 554	Financial Mathematics	3
MATH 555	Actuarial Modeling I	3
MATH 557	Financial Derivatives	3
ACCT 203	Survey of Accounting	3
ECON 103	Contemporary Microeconomic Principles (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
ECON 306	Intermediate Microeconomics <sup>1</sup>	3
or ECON 310	Money and Banking	
or FNAN 321	Financial Institutions	
STAT 362	Introduction to Computer Statistical Packages	3
Select two from the following:		6
MATH 441	Deterministic Optimization	
MATH 442	Stochastic Models	
MATH 446	Numerical Analysis I	
MATH 453	Advanced Mathematical Statistics	
Total Credits		36

1

For mathematics majors, the Department of Economics has agreed to waive the ECON 104 prerequisite.

### Concentration in Applied Mathematics (AMT)

This concentration provides exciting opportunities for students interested in taking additional classes in applied mathematics. The concentration prepares students to deal with real-world applications in science and engineering, or to pursue graduate studies in applied mathematics.

Code	Title	Credits
<b>AMT Courses</b>		
MATH 313	Introduction to Applied Analysis	3
MATH 315	Advanced Calculus I	3
MATH 351	Probability	3
MATH 413	Modern Applied Mathematics I	3
MATH 446	Numerical Analysis I	3

Select 3 credits of MATH courses numbered above 300 ( <a href="http://catalog.gmu.edu/courses/math/">http://catalog.gmu.edu/courses/math/</a> ) <sup>1</sup>	3
Select two courses from the following:	6
MATH 314      Advanced Differential Equations	
MATH 414      Modern Applied Mathematics II	
MATH 478      Introduction to Partial Differential Equations with Numerical Methods	
<b>Additional Science Courses</b>	
Select additional science credits from one of the following options:	4-9
1. A second sequence from the choices under "Science" above	
2. Select 6 credits from more advanced courses in biology, chemistry, geology, or physics <sup>2</sup>	
3. The 4-credit option of PHYS 262 and PHYS 263	
4. Select two courses from the following:	
CDS 230      Modeling and Simulation I	
CDS 301      Scientific Information and Data Visualization	
CS 211      Object-Oriented Programming	
CS 310      Data Structures	
CS 330      Formal Methods and Models	
CS 483      Analysis of Algorithms	
Total Credits	28-33

1

Excluding MATH 400 History of Math (Topic Varies) (Mason Core) (<http://catalog.gmu.edu/mason-core/>)

2

Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

### Concentration in Data Science (DSCI)

The data science concentration prepares math majors for careers in industry and academia with a focus on the rapidly developing area of mathematics of data science. Students in this program will develop analytical and computational skills that will provide a deeper understanding of machine learning and data science concepts. By mastering the theoretical foundation underlying practical algorithms and uncovering inherent connections with several branches of modern mathematics, students will hone their creativity and independent thinking skills necessary to lead the data science revolution.

Code	Title	Credits
<b>Data Science Courses</b>		
MATH 315	Advanced Calculus I	3
MATH 351	Probability	3
MATH 446	Numerical Analysis I	3
MATH 464	Linear Algebra with Data Applications	3
Select two options from the following:		6-7
MATH 447	Numerical Analysis II	
MATH 462 & MATH 463	Mathematics of Machine Learning and Industrial Applications I and Mathematics of Machine Learning and Industrial Applications II	

MATH 465	Mathematics of Data Science	
Select one course from the following:		3
MATH 352	Statistics	
STAT 350	Introductory Statistics II	
STAT 360	Introduction to Statistical Practice II	
STAT 356	Statistical Theory	
Select one course from the following:		3
CDS 301	Scientific Information and Data Visualization	
CDS 302	Scientific Data and Databases (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
CS 310	Data Structures	
<b>Additional Science Courses</b>		
Select additional science credits from one of the following options:		3-4
1. Select one course from the following:		
BIOL 213	Cell Structure and Function (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and General Chemistry Laboratory I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
GEOL 101 & GEOL 103	Physical Geology (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and Physical Geology Lab (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
PHYS 160 & PHYS 161	University Physics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and University Physics I Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
2. 3 credits from more advanced courses in biology, chemistry, geology, or physics <sup>1</sup>		
3. The 4 credit option of PHYS 262 and PHYS 263		
Total Credits		27-29

1

Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

### Concentration in Mathematical Statistics (MTHS)

This concentration provides exciting opportunities for students interested in taking additional classes on statistics and data analysis. The concentration prepares data analysts able to deal with real world applications in science and engineering.

Code	Title	Credits
<b>MTHS Courses</b>		
MATH 315	Advanced Calculus I	3
MATH 351	Probability	3
MATH 352	Statistics	3
MATH 453	Advanced Mathematical Statistics	3
MATH 551	Regression and Time Series	3

STAT 362	Introduction to Computer Statistical Packages	3
Select one from:		3
STAT 260	Introduction to Statistical Practice I	
STAT 350	Introductory Statistics II	
STAT 360	Introduction to Statistical Practice II	
Select two from the following:		6
STAT 455	Experimental Design	
STAT 460	Introduction to Biostatistics	
STAT 462	Applied Multivariate Statistics	
STAT 463	Introduction to Exploratory Data Analysis	
STAT 465	Nonparametric Statistics and Categorical Data Analysis	
STAT 472	Introduction to Statistical Learning	
STAT 474	Introduction to Survey Sampling	
<b>Additional Science Courses</b>		
Select additional science credits from one of the following options:		3-4
1. Choose one from the following different lab sciences:		
BIOL 213	Cell Structure and Function (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and General Chemistry Laboratory I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
GEOL 101 & GEOL 103	Physical Geology (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and Physical Geology Lab (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
PHYS 160 & PHYS 161	University Physics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> ) and University Physics I Laboratory (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	
2. Choose 3 credits from more advanced courses in biology, chemistry, geology, or physics <sup>1</sup>		
3. Choose the 4 credit option of PHYS 262 and PHYS 263		
4. Choose one course from the following:		
CDS 230	Modeling and Simulation I	
CDS 301	Scientific Information and Data Visualization	
CS 211	Object-Oriented Programming	
CS 310	Data Structures	
CS 330	Formal Methods and Models	
CS 483	Analysis of Algorithms	
Total Credits		30-31

1

Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

## Mason Core and Elective Credits

In order to meet a minimum of 120 credits, this degree requires additional credits (specific credit counts by concentration are shown

below), which may be applied toward any remaining Mason Core (<http://catalog.gmu.edu/mason-core/>) requirements (outlined below), Requirements for Bachelor's Degrees (<http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2>), and elective courses<sup>1</sup>. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

- INDC concentration: 51-57 credits
- PURM concentration: 51-57 credits
- ACTM concentration: 45-46 credits
- AMT concentration: 48-54 credits
- DSCI concentration: 52-55 credits
- MTHS concentration: 50-52 credits

1

A maximum of 12 credits between MATH 490 Internship and MATH 491 Reading and Undergraduate Research in Mathematics can be applied to this degree.

## Mason Core

Some Mason Core (<http://catalog.gmu.edu/mason-core/>) requirements may already be fulfilled by the major requirements listed above. Students are strongly encouraged to consult their advisors to ensure they fulfill all remaining Mason Core (<http://catalog.gmu.edu/mason-core/>) requirements.

Students who have completed the following credentials are eligible for a waiver of the Foundation and Exploration (lower level) requirement categories. The Integration category (upper level) is not waived under this policy. See Admissions (<http://catalog.gmu.edu/admissions/undergraduate-policies/#transfertext>) for more information.

- VCCS Uniform Certificate of General Studies
- VCCS or Richard Bland Associate of Science (A.S.), Associate of Arts (A.A.), Associate of Arts and Sciences (A.A.&S.), or Associate of Fine Arts (A.F.A.)

Code	Title	Credits
<b>Foundation Requirements</b>		
	Written Communication (lower-level) ( <a href="http://catalog.gmu.edu/mason-core/#written">http://catalog.gmu.edu/mason-core/#written</a> )	3
	Oral Communication ( <a href="http://catalog.gmu.edu/mason-core/#oral">http://catalog.gmu.edu/mason-core/#oral</a> )	3
	Quantitative Reasoning ( <a href="http://catalog.gmu.edu/mason-core/#quantitative">http://catalog.gmu.edu/mason-core/#quantitative</a> )	3
	Information Technology and Computing ( <a href="http://catalog.gmu.edu/mason-core/#information-technology">http://catalog.gmu.edu/mason-core/#information-technology</a> )	3
<b>Exploration Requirements</b>		
	Arts ( <a href="http://catalog.gmu.edu/mason-core/#arts">http://catalog.gmu.edu/mason-core/#arts</a> )	3
	Global Contexts ( <a href="http://catalog.gmu.edu/mason-core/#global-contexts">http://catalog.gmu.edu/mason-core/#global-contexts</a> )	3
	Global History ( <a href="http://catalog.gmu.edu/mason-core/#global-history">http://catalog.gmu.edu/mason-core/#global-history</a> )	3
	Literature ( <a href="http://catalog.gmu.edu/mason-core/#literature">http://catalog.gmu.edu/mason-core/#literature</a> )	3
	Natural Science ( <a href="http://catalog.gmu.edu/mason-core/#natural-science">http://catalog.gmu.edu/mason-core/#natural-science</a> )	7
	Social and Behavioral Sciences ( <a href="http://catalog.gmu.edu/mason-core/#social-behavioral-science">http://catalog.gmu.edu/mason-core/#social-behavioral-science</a> )	3
	Just Societies (optional) ( <a href="http://catalog.gmu.edu/mason-core/#justsocieties">http://catalog.gmu.edu/mason-core/#justsocieties</a> ) <sup>1</sup>	1

**Integration Requirements**

Written Communication (upper-level) ( <a href="http://catalog.gmu.edu/mason-core/#written">http://catalog.gmu.edu/mason-core/#written</a> )	3
Writing Intensive ( <a href="http://catalog.gmu.edu/mason-core/#wi">http://catalog.gmu.edu/mason-core/#wi</a> ) <sup>2</sup>	3
Mason Apex ( <a href="http://catalog.gmu.edu/mason-core/#apex">http://catalog.gmu.edu/mason-core/#apex</a> ) <sup>3</sup>	3
<b>Total Credits</b>	<b>40</b>

1

In addition to covering content related to the designated category, Exploration level courses marked with a *Just Societies* "flag" are specifically designed to help students learn how to interact effectively with others from all walks of life, including those with backgrounds and beliefs that differ from their own. Courses marked with the Just Societies flag are available for students starting in Fall 2024. Students admitted prior to the Fall of 2025 are not required to take courses with a Just Societies flag but may wish to do so to increase their knowledge and skills in this important area. Students interested in this approach to completing their Mason Core Exploration Requirements should work closely with their advisor to identify the appropriate Just Societies-flagged courses.

2

Most programs include the writing-intensive course designated for the major as part of the major requirements; this course is therefore not counted towards the total required for Mason Core.

3

Minimum 3 credits required.

**Honors****Honors in the Major****Eligibility**

Mathematics majors who have maintained a GPA of at least 3.50 in mathematics courses and a GPA of 3.50 in all courses taken at George Mason University may apply to the departmental honors program upon completion of two MATH courses at the 300+ level (excluding MATH 400 History of Math (Topic Varies) (Mason Core) (<http://catalog.gmu.edu/mason-core/>)), at least one of which has MATH 300 Introduction to Advanced Mathematics (Mason Core) (<http://catalog.gmu.edu/mason-core/>) as a prerequisite. Admission to the program will be monitored by the undergraduate committee.

**Honors Requirements**

To graduate with honors in mathematics, a student is required to maintain a minimum GPA of 3.50 in mathematics courses and successfully complete MATH 405 Honors Thesis in Mathematics I and MATH 406 RS: Honors Thesis in Mathematics II with an average GPA of at least 3.50 in these two courses.

**Accelerated Master's****Mathematics, BA or BS/Curriculum and Instruction, Accelerated MEd, (Secondary Education Mathematics Concentration)****Overview**

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program and obtain a BA (<http://catalog.gmu.edu/colleges-schools/science/mathematical-sciences/mathematics-ba/>) or BS in Mathematics and an MEd in Curriculum and Instruction (Secondary Education Mathematics concentration) (<https://catalog.gmu.edu/colleges-schools/education-human-development/school-education/curriculum-instruction-med/>) in an accelerated time-frame after satisfactory completion of a minimum of 143 credits.

See AP6.7 Bachelor's/Accelerated Master's Degree (<http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7>) for policies related to this program.

This accelerated option is offered jointly by the Department of Mathematical Sciences (<http://catalog.gmu.edu/colleges-schools/science/mathematical-sciences/>) and the School of Education (<http://catalog.gmu.edu/colleges-schools/education-human-development/school-education/>).

Students in an accelerated degree program must fulfill all university requirements for the master's degree. For policies governing all graduate degrees, see AP6 Graduate Policies (<http://catalog.gmu.edu/policies/academic/graduate-policies/#text>).

**BAM Pathway Admission Requirements**

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions Policies (<https://catalog.gmu.edu/admissions/graduate-policies/>) and Bachelor's/Accelerated Master's Degree (<https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7>) policies. For information specific to this accelerated master's program, see Application Requirements and Deadlines (<https://cehd.gmu.edu/bachelors-accelerated-masters-program/>).

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits, and additional unit-specific criteria.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits and course-specific pre-requisites.

**Accelerated Master's Admission Requirements**

Students already admitted in the BAM Pathway will be admitted to the MEd program, if they have met the following criteria, as verified on the Bachelor's/Accelerated Master's Transition form:

- 3.0 overall GPA
- Completion of specific undergraduate coursework
- Successfully meeting Mason's requirements for undergraduate degree conferral (graduation) and completing the application for graduation.

## Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, undergraduate students interested in taking graduate courses must choose from the following which can be taken as Advanced Standing or Reserve Graduate credit (<https://catalog.gmu.edu/policies/academic/graduate-policies/#text>) (to be determined by the student and their advisor):

Code	Title	Credits
EDRD 619	Disciplinary Literacy	3
SEED 522	Foundations of Secondary Education	3
SEED 540	Human Development and Learning: Secondary Education	3
SEED 572	Teaching Mathematics in the Secondary School	3
SEED 672	Advanced Methods of Teaching Mathematics in the Secondary School	3
SEED approved elective ( <a href="http://catalog.gmu.edu/courses/seed/">http://catalog.gmu.edu/courses/seed/</a> )		

For more detailed information on coursework and timeline requirements, see AP6.7 Bachelor's/Accelerated Master's Degree (<https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7>) policies.

## Mathematics, BA or BS/Mathematics, Accelerated MS

### Overview

This bachelor's/accelerated master's degree program allows academically strong undergraduates with a commitment to advance their education to obtain the Mathematics, BA (<http://catalog.gmu.edu/colleges-schools/science/mathematical-sciences/mathematics-ba/>) or Mathematics, BS and the Mathematics, MS (<http://catalog.gmu.edu/colleges-schools/science/mathematical-sciences/mathematics-ms/>) degrees within an accelerated timeframe. Upon completion of this 138 credit accelerated program, students will be exceptionally well prepared for entry into their careers or into a doctoral program in the field or in a related discipline.

Students are eligible to apply for this accelerated program once they have earned at least 60 undergraduate credits and can enroll in up to 18 credits of graduate coursework after successfully completing 75 undergraduate credits. This flexibility makes it possible for students to complete a bachelor's and a master's in five years.

For more detailed information, see AP6.7 Bachelor's/Accelerated Master's Degrees (<http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7>). For policies governing all graduate degrees, see AP6 Graduate Policies (<http://catalog.gmu.edu/policies/academic/graduate-policies/>). For more information on undergraduates enrolling in graduate courses, see AP1.4.4 Graduate Course Enrollment by Undergraduates (<http://catalog.gmu.edu/policies/academic/registration-attendance/#text>).

### Application Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in the Graduate Admission Policies (<http://catalog.gmu.edu/admissions/graduate-policies/>) section of this catalog.

Important application information and processes for this accelerated master's program can be found here (<https://www.gmu.edu/admissions-aid/accelerated-masters/>).

Students should seek out the graduate program's advisor who will aid in choosing the appropriate graduate courses and help prepare the student for graduate studies.

Successful applicants will have an overall undergraduate GPA of at least 3.00. Additionally, they will have completed the following courses with a GPA of 3.00 or higher:

Code	Title	Credits
MATH 315	Advanced Calculus I	3
MATH 321	Abstract Algebra	3
MATH 322	Advanced Linear Algebra	3

### Accelerated Option Requirements

After the completion of 75 undergraduate credits, students may complete 3 to 12 credits of graduate coursework that can apply to both the undergraduate and graduate degrees.

In addition to applying to graduate from the undergraduate program, students in the accelerated program must submit a bachelor's/accelerated master's transition form (available from the Office of the University Registrar (<https://registrar.gmu.edu/forms/>)) to the College of Science's Office of Academic and Student Affairs (<https://cos.gmu.edu/about/contact-us/>) by the last day to add classes of their final undergraduate semester. Students should enroll for courses in the master's program in the fall or spring semester immediately following conferral of the bachelor's degree, but should contact an advisor if they would like to defer up to one semester.

Students must maintain an overall GPA of 3.00 or higher in all graduate coursework and should consult with their faculty advisor to coordinate their academic goals.

### Reserve Graduate Credit

Accelerated master's students may also take up to 6 graduate credits as reserve graduate credits. These credits do not apply to the undergraduate degree, but will reduce the master's degree by up to 6 credits. With 12 graduate credits counted toward the undergraduate and graduate degrees plus the maximum 6 reserve graduate credits, the credits necessary for the graduate degree can be reduced by up to 18.

### Graduate Course Suggestions

The following list of suggested courses is provided for general reference. To ensure an efficient route to graduation and post-graduation readiness, students are strongly encouraged to meet with an advisor before registering for graduate-level courses.

Code	Title	Credits
MATH 621	Algebra I	3
MATH 631	Topology I: Topology of Metric Spaces	3
MATH 675	Linear Analysis	3
MATH 677	Ordinary Differential Equations	3
MATH 685	Numerical Analysis	3

## BS (any)/Statistical Science, Accelerated MS

### Overview

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program (BAM) and obtain an undergraduate BS degree and the Statistical Science, MS (<http://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/statistics/statistical-science-ms/>) in an accelerated time-frame after satisfactory completion of a minimum of 138 credits.

Admitted students are able to use up to 12 graduate credits in partial satisfaction of requirements for the undergraduate degree. Upon completion and conferral of the bachelor's degree and with satisfactory performance (grade of 'B' or better) in each of the graduate courses, students are given advanced standing in the master's program.

See AP.6.7 Bachelor's/Accelerated Master's Degrees (<http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7>) for policies related to this program.

Students in an accelerated degree program must fulfill all university requirements for the master's degree. For policies governing all graduate degrees, see AP.6 Graduate Policies (<http://catalog.gmu.edu/policies/academic/graduate-policies/>).

### BAM Pathway Admission Requirements

No specific undergraduate BS degree is required. Students enrolled in any BS degree may apply to the accelerated Statistical Science, MS (<http://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/statistics/statistical-science-ms/>) program **if such an accelerated Statistical Science, MS (<http://catalog.gmu.edu/colleges-schools/engineering-computing/school-computing/statistics/statistical-science-ms/>) pathway is allowable from the student's BS program, which will be determined by the academic advisors of both the BS and MS programs.**

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions Policies and Bachelor's/Accelerated Master's Degree policies.

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits with an overall GPA of 3.0.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits and course-specific prerequisites.

### Accelerated Master's Admission Requirements

Students already admitted in the BAM Pathway will be admitted to the Statistical Science, MS program, if they have met the following criteria, as verified on the Bachelor's/Accelerated Master's Transition form:

- Completion of Mason's requirements for undergraduate degree conferral (graduation) and completion of application for graduation.
- An overall GPA of 3.00.
- Completion of the following Mason courses each with a grade of C or better:

Code	Title	Credits
MATH 213	Analytic Geometry and Calculus III	3
MATH 203 or MATH 321	Linear Algebra Abstract Algebra	3
STAT 250	Introductory Statistics I (Mason Core) ( <a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a> )	3
or STAT 344	Probability and Statistics for Engineers and Scientists I	
STAT 346 or MATH 351	Probability for Engineers Probability	3
STAT 362	Introduction to Computer Statistical Packages	3

### Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, students complete all credits satisfying degree requirements for the BS and MS programs, with up to twelve credits overlap chosen from the following graduate courses:

Code	Title	Credits
STAT 544	Applied Probability	3
STAT 554	Applied Statistics I	3
STAT 560	Biostatistical Methods	3
STAT 574	Survey Sampling I	3
STAT 663	Statistical Graphics and Data Visualization	3

All graduate course prerequisites must be completed prior to enrollment.

Each graduate course must be completed with a grade of B or better to apply toward the MS degree.

While still in undergraduate status, a maximum of 6 additional graduate credits may be taken as reserve graduate credit and applied to the master's program. Reserve graduate credits do not apply to the undergraduate degree.

For more detailed information on coursework and timeline requirements, see AP.6.7 Bachelor's/Accelerated Master's Degrees (<http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7>) policies.

### Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form that is submitted to the Office of the University Registrar and Graduate Recruitment and Enrollment Services. At the completion of MS requirements, a master's degree is conferred.